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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/990,171	11/21/2001	Mehran Nasser-Ghodsi	KLA1P041/P773	2367

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EXAMINER	
KIKNADZE, IRAKLI	

ART UNIT	PAPER NUMBER
2882	

DATE MAILED: 12/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/990,171	NASSER-GHODSI ET AL.	
	Examiner	Art Unit	
	Irakli Kiknadze	2882	MW

-- Th MAILING DATE of this communication appears on the cover sheet with the correspond nce address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-41 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-41 is/are rejected.

7)☒ Claim(s) 37 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Objections

1. Claim 37 is objected to because of the following informalities: The claim 37 must be in one sentence form only. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-2, 4-22, 24-34 and 37-39 are rejected under 35 U.S.C. 102(e) as being anticipated by Mazor et al. (US Patent 6,351,516 B1).

With respect to claim 1, Mazor teaches an apparatus (Fig. 4) for characterizing a void in a first scan target associated with a sample, the sample having a first surface and a second surface, the apparatus comprising: an x-ray emission inducer (64) configured to scan a target (40), the x-ray emission inducer causes the target to emit x-rays from the first surface; an x-ray emission detection system (68) configured to obtain a measurement of the x-rays emitted from the first surface of the sample, wherein the x-ray measurement is compared to a control measurement to characterize a void in the first scan target (column 2; lines 30-51).

With respect to claim 2, a stage (62) is configured to secure the sample (42), wherein the stage is configured to position the sample relative to the x-ray emission inducer (64). Positioning the sample comprises rotating the sample (column 5; lines 61-66) .

With respect to claims 4 and 5, the first scan target comprises a via. The sample is a wafer comprising a plurality of integrated circuits (column 1; line 65 – column 2; line 8).

With respect to claims 6-9, the x-ray emission detection system is configured to detect X-rays with a first emission energy corresponding to a first material. The first material comprises Cu. Further, the detection system configured to detect X-rays with a second emission energy corresponding to a second material. The second material comprises Ta (column 5; line 42 – column 6; line 63).

With respect to claim 10, the control measurement is obtained by scanning an adjacent scan target (column 4; lines 26-65).

With respect to claims 11 and 24, Mazor teaches (Fig.4) a system (60) and method for characterizing voids associated with a sample (40), the sample having a first surface and a second surface, the system comprising: memory; a processor (70) coupled with memory, the processor configured to identify a first measurement of induced x-ray emissions characteristic of a first material at a first scan target, identify a control measurement, and provide the first measurement and the control measurement for comparison to thereby obtain information for characterizing a void associated with the first scan target in the sample (column 5; line 61 – column 6; line 35).

With respect to claims 12-13 and 25-26, the first material is copper having low resistivity (column 6; lines 7-15).

With respect to claim 14 and 27, the sample is a wafer comprising a plurality of integrated circuits .

With respect to claims 15-17 and 28-30, the system identifies a second measurement of x-ray emissions characteristic of a second material. The second material is a barrier material (column 4; line 60). The second material is Ta.

With respect to claims 18-21 and 30-34, voids associated with the sample comprises determining the size and location of a void. The control measurement is obtained by scanning an adjacent scan target (column 5; lines 62-67).

With respect to claims 37-39, Mazor teaches an apparatus (60) for characterizing a void (34) in a sample (42), the apparatus comprising: means for identifying a first measurement of induced x-ray emissions characteristic of a first material at a first scan target, means for identifying a control measurement; means for providing the first measurement and the control measurement for
comparison to thereby obtain information for characterizing a void associated with the first scan target in the sample (column 2; lines 30-51). The control measurement is obtained by scanning an adjacent scan target. The adjacent scan target is an adjacent via (column 2; lines 52-63).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 3, 23, 24, 35, 36, 40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mazor et al. (US Patent 6,351,516 B1) in view of Lewis et al. (US Patent 5,705,878).

With respect to claims 3, 23, 24, 35, 36, 40 and 41, Mazor teaches that the wafer is mounted on a movable platform, such as an X-Y stage, to allow scanning of neighboring scan targets and provide information about finding and evaluating voids, also thickness uniformity for material deposition in the targets (column 2; lines 52-63). Mazor is silent about scanning adjacent targets in the +X, -X, +Y and –Y or +2X, -2X, +2Y and –2Y positions. Lewis teaches a scanner incorporating a flat stage for receiving a sample and comprising means for scanning +X, -X, +Y and –Y position for allowing scanning in adjacent locations (column 3; lines 24-54). It would have been obvious to one of ordinary skill in the art at the same time of the invention was made to provide scanning means and teaching of Lewis with the Mazor's invention to allow scanning of neighboring scan targets and provide information about finding and evaluating voids.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Irakli Kiknadze whose telephone number is (703) 305-6464. The examiner can normally be reached on M-F(8:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (703) 308-4858. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Irakli Kiknadze
December 12, 2003
IK

Craig E Church